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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/620,865	07/15/2003	Daisuke Hanaoka	245402006600	9131

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EXAMINER	
VAN ROY, TOD THOMAS	
ART UNIT	**PAPER NUMBER**
2828	

DATE MAILED: 09/21/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 10/620,865	Applicant(s) HANAOKA, DAISUKE
	Examiner Tod T. Van Roy	Art Unit 2828

-- *The MAILING DATE of this communication appears on the cover sheet with the correspondence address* --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *12 July 2005*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-17* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-17* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other: _____.

DETAILED ACTION

Drawings

The drawing objections are withdrawn after consideration of the applicant's remarks filed on 07/12/2005.

Response to Arguments

Applicant's arguments filed 07/12/2005 have been fully considered but they are not persuasive.

The following is a summary of the applicant's arguments and corresponding rebuttal:

Page 8 para.3 of the applicant's remarks state that the teachings of Reid are directly solely towards a telecommunications laser, and hence, the use of Onomura's material type would not be practical.

Reid does teach that the laser is directed for use in the telecommunication field, but has advantages that one of ordinary skill in the art would find advantageous to use in other areas. Reid points out that his device maintains a high power output beam and a narrow far field (Reid, abs.). These advantages would also be useful for the precise writing of data onto storage media that is commonly done using the material type of Onomura (i.e., 400nm wavelength light). Thus Reid does teach the use of the device in telecommunications applications, however, it has been described above that the advantages of the device would also be applicable to common uses of Onomura's material type.

Page 8 para.4 of the applicant's remarks state that the differences in the crystal types of Reid and Onomura would not allow for an obvious combination of their dimensions.

The examiner agrees with the applicant that two different crystal structures exist in these references, however, it is believed that having the dimensions as cited in claim 1, with either crystal structure, would not negatively affect the operation of the device. It would appear that changing of dimensions on a much smaller scale, say Angstroms, would arguably complicate matters due to lattice spacing, but when dealing with hundreds of microns in the length and width directions, these limitations would not be a matter of concern for device stress or stability.

Page 9 para.2 of the applicant's remarks state that Onomura's teaching of using specific layers to reduce strain and defects teaches away from changing the length and/or width of the device.

The examiner agrees that Onomura does not teach that changing the length or width would reduce strain and defects, but the teaching of different methodologies for resolving the strain problem does not constitute teaching away from the actual changing of the dimensions or material in question. Onomura's disclosure teaches a different matter (use of specific layers), and the teaching of that matter does not imply that other matters (changing length and width dimensions) are to be avoided.

Page 9 para.3 of the applicant's remarks states "the length should be dependent on the width".

In response to applicant's argument that the references fail to show certain features of applicant's invention, it is noted that the features upon which applicant relies (i.e., length being dependent on the width) are not recited in the rejected claim(s). Although the claims are interpreted in light of the specification, limitations from the specification are not read into the claims. See *In re Van Geuns*, 988 F.2d 1181, 26 USPQ2d 1057 (Fed. Cir. 1993).

Reid teaches that which is claimed in claim 1 with regards to the length/width being more than 2.5. The claim does not state that dependence between the length and the width must exist, it simply states that the ratio must be present.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1-17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Reid (US 2003/0210720) in view of Onomura et al. (US 2002/0039374).

With respect to claims 1 and 8, Reid teaches a semiconductor laser device chip (fig.1) having a semiconductor stacked-layered structure including an n-type layer (fig.1 #9), an active layer (fig.1 #12) and a p-type layer (fig.1 #8') successively stacked on a main surface of a semiconductor substrate (fig.1 #11) and having a ridge stripe structure formed in a portion of said p-type layer (fig.1 #15) wherein said chip has a length L1 of more than 500um in a longitudinal direction of said strip structure ([0048] lines 9-10) and a length L2 of more than 200um in a width direction of said stripe structure ([0048] lines 7-8), and L1/L2 is more than 2.5 (4mm/.5mm=8). Reid does not teach the semiconductor laser device chip to be a nitride semiconductor laser device with a nitride substrate. Onomura teaches a nitride semiconductor laser device chip (wherein the layers being provide are based in the GaN material system and constitute a hexagonal crystal structure) with an n-type layer (fig.4 #15) an active layer (fig.4 #16) and a p-type layer (fig.4 #19) successively stacked on a main surface of a nitride semiconductor substrate (fig.4 #30) having a ridge stripe structure formed in a portion of said p-type layer (fig.4 #19). It would have been obvious to one of ordinary skill at the time the invention was made to combine the semiconductor laser device chip of Reid with the nitride material of Onomura to adjust the wavelength to an appropriate length (active region), and further, to balance the strain induced by the potential lattice mismatch (n and p type layers, also see Onomura [0006-0007]).

With respect to claim 2, the nitride semiconductor laser device as taught by Reid and Onomura further discloses the total thickness of said nitride semiconductor substrate and said nitride semiconductor stacked-layered structure to be more than 50um and less than 200um (Reid, [0046-0047] total thickness approx. 150um).

With respect to claim 3, the nitride semiconductor laser device as taught by Reid and Onomura further discloses said stripe structure to be formed at a position more than 10um away in the width direction of said stripe structure from an edge of said chip (Reid, fig.1 #15, where #15 is clearly centered on the nitride structure and #15 being not more than 7um wide, [0048] lines 6-7).

With respect to claim 4, Onomura further teaches a nitride semiconductor laser apparatus to include a support member for placing the nitride semiconductor laser device chip, as outlined in the rejection to claim 1 above, thereon (Onomura, [0074] lines 1-4).

With respect to claim 5, Onomura further teaches the nitride laser apparatus outlined in the rejection to claim 4 above to include said support member to have a larger thermal expansion coefficient as compared to said nitride semiconductor substrate (Onomura, [0074] lines 1-4, the Cu support member inherently has a larger thermal expansion coefficient as compared with the GaN substrate).

With respect to claim 6, Onomura further teaches the nitride laser apparatus outlined in the rejection to claim 4 above to include said support member to be one of Al, Ag, Cu, Fe, Al-SiC, CuW and BeO (Onomura, [0074] lines 1-4).

With respect to claim 7, Onomura further teaches the nitride laser apparatus outlined in the rejection to claim 4 above to include a solder joining said laser device chip to said support member, and said solder to be one of AuSn, AgSn, AuSi, AuGe, PbSn, InSn and AgCuSn (Onomura, [0052] lines 5-8).

With respect to claim 9, Reid and Onomura teach the nitride laser outlined in the rejection to claim 7, and Onomura further teaches a multilayer metal film comprising an outermost layer comprising Au is formed on a second surface of the semiconductor substrate opposite the main surface and the outermost surface is connected to the support member by the solder ([0051]). It would have been obvious to one of ordinary skill in the art at the time of the invention to attach the semiconductor device to the heat sink via the metal film in order to facilitate a more efficient heat transfer from the device, to the heat conductive metal film, and then to the heat sink.

With respect to claim 10, Reid and Onomura teach the nitride laser outlined in the rejection to claim 7, and additionally the use of a multilayer metal film as outlined in the rejection to claim 9, and the use of a top surface of the stack layer to be connected to the heat sink (Onomura, [0074]). Reid and Onomura do not teach combining the multilayer film with the top surface heat sink bonding. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the top surface heat sink bonding with the multilayer film to sink heat quickly away from the active region and to facilitate a more efficient heat transfer from the device, to the heat conductive metal film, and then to the heat sink.

With respect to claim 11, Reid teaches a semiconductor laser device chip (fig.1) having a semiconductor stacked-layered structure including an n-type layer (fig.1 #9), an active layer (fig.1 #12) and a p-type layer (fig.1 #8') successively stacked on a main surface of a semiconductor substrate (fig.1 #11) and having a ridge stripe structure formed in a portion of said p-type layer (fig.1 #15) wherein said chip has a length L1 of more than 500um in a longitudinal direction of said strip structure ([0048] lines 9-10) and a length L2 of more than 200um in a width direction of said stripe structure ([0048] lines 7-8), and L1/L2 is more than 2.5 (4mm/.5mm=8), and the total thickness of the semiconductor substrate and semiconductor stacked-layered structure to be more than 50um and less than 200um (Reid, [0046-0047] total thickness approx. 150um). Reid does not teach the semiconductor laser device chip to be a nitride semiconductor laser device with a nitride substrate, or to use a support member. Onomura teaches a nitride semiconductor laser device chip (wherein the layers being provide are based in the GaN material system and constitute a hexagonal crystal structure) with an n-type layer (fig.4 #15) an active layer (fig.4 #16) and a p-type layer (fig.4 #19) successively stacked on a main surface of a nitride semiconductor substrate (fig.4 #30) having a ridge stripe structure formed in a portion of said p-type layer (fig.4 #19), and further teaches the nitride semiconductor laser apparatus to include a support member for placing the nitride semiconductor laser device chip thereon (Onomura, [0074] lines 1-4). It would have been obvious to one of ordinary skill at the time the invention was made to combine the semiconductor laser device chip of Reid with the nitride material of Onomura to adjust the wavelength to an appropriate length (active region), and further,

to include a support device to sink heat away from the device and improve the performance and reliability.

With respect to claim 12, the nitride semiconductor laser device as taught by Reid and Onomura further discloses said stripe structure to be formed at a position more than 10um away in the width direction of said stripe structure from an edge of said chip (Reid, fig.1 #15, where #15 is clearly centered on the nitride structure and #15 being not more than 7um wide, [0048] lines 6-7).

With respect to claim 13, Onomura further teaches the nitride laser apparatus outlined in the rejection to claim 4 above to include said support member to have a larger thermal expansion coefficient as compared to said nitride semiconductor substrate (Onomura, [0074] lines 1-4, the Cu support member inherently has a larger thermal expansion coefficient as compared with the GaN substrate).

With respect to claim 14, Onomura further teaches the nitride laser apparatus outlined in the rejection to claim 4 above to include said support member to be one of Al, Ag, Cu, Fe, Al-SiC, CuW and BeO (Onomura, [0074] lines 1-4).

With respect to claim 15, Onomura further teaches the nitride laser apparatus outlined in the rejection to claim 4 above to include a solder joining said laser device chip to said support member, and said solder to be one of AuSn, AgSn, AuSi, AuGe, PbSn, InSn and AgCuSn (Onomura, [0052] lines 5-8).

With respect to claim 16, Reid and Onomura teach the nitride laser outlined in the rejection to claim 7, and Onomura further teaches a multilayer metal film comprising an outermost layer comprising Au is formed on a second surface of the semiconductor

substrate opposite the main surface and the outermost surface is connected to the support member by the solder ([0051]). It would have been obvious to one of ordinary skill in the art at the time of the invention to attach the semiconductor device to the heat sink via the metal film in order to facilitate a more efficient heat transfer from the device, to the heat conductive metal film, and then to the heat sink.

With respect to claim 17, Reid and Onomura teach the nitride laser outlined in the rejection to claim 7, and additionally the use of a multilayer metal film as outlined in the rejection to claim 9, and the use of a top surface of the stack layer to be connected to the heat sink (Onomura, [0074]). Reid and Onomura do not teach combining the multilayer film with the top surface heat sink bonding. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the top surface heat sink bonding with the multilayer film to sink heat quickly away from the active region and to facilitate a more efficient heat transfer from the device, to the heat conductive metal film, and then to the heat sink.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Tod T. Van Roy whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

TVR

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PRIMARY EXAMINER